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WINCHELL ON OPHITIC TEXTURE

TO THE EDITOR OF SCIENCE: In the proceedings of the twenty-first annual meeting of the Geological Society of America, Volume 20 of the *Bulletin*, pages 661 to 667, Professor A. N. Winchell has a paper upon the use of ophitic and related terms in petrography. Since I in my report for 1909 shall continue to use the term in a somewhat narrower sense than that advocated by Professor Winchell,¹ a few words of explanation may not be out of place. I shall not plead that publication of the paper was too late to be availed of since Professor Winchell was kind enough to let me read it some time ago. Nor is the argument that one should not change his usage in what may perhaps be the last of my reports of entirely determining weight, though in view of the fact that what I have called ophites Winchell would also call ophitic, the point has a certain weight. The facts regarding the early and later use of the term ophitic are fully given by Winchell in the article referred to, with perhaps one exception. That is, in the article from which Winchell cites the original definition of Michel-Lévy in the *Bulletin of the Geological Society of France*, Volume 6, 1878, page 158, only a few pages later (on page 169) he says, "the most characteristic mineral of the ophites is the diallage in the large areas." It seems to me, therefore, very questionable if one should extend the term so as to apply it as Winchell suggests "to all rocks having plagioclase in lath-shaped crystals of earlier formations." In fact, it seems to me the petrographically and chemically important thing is the fact that the rock has pretty nearly the composition of a bisilicate and that this bisilicate may be considered as the solvent in which the other constituents are dissolved, from the fluid or molten solution of which they crystallize. One finds, for instance, in the quartz diabases, rocks in which the plagioclase is distinctly in lath-shaped crystals of early formation, but in which the matrix is not pyroxene. It seems to me that,

¹ The same sense in which it is used by the list of writers cited by him, to which may be added Grout, in SCIENCE for September 2, 1910, p. 313.

as cited by Winchell in the earlier or later definition, a pyroxenic matrix is an essential part of the idea of the ophites.

I am, however, quite willing to give up the idea that the augite must necessarily be altogether in larger grains than the feldspar. In fact, in almost all the so-called ophitic rocks at a proper distance not far from the margin one will find a transition from a glassy intersertal or microlitic texture to the coarse ophitic texture, in which the augite acts as matrix to the feldspar, but is so fine grained that several granules may combine in acting as a matrix for a single feldspar. Now this structure would certainly be covered by the original definition as cited by Winchell, in which the size of the augite is not emphasized. But the fact of a pyroxenic matrix seems to me essential to the idea. The extension to a rock in which the pyroxene is replaced by native iron is perhaps an extension by analogy.

ALFRED C. LANE

THE REFORM OF THE CALENDAR

TO THE EDITOR OF SCIENCE: The suggestions of Professor Reininghaus and Doctor Slocum concerning the reform of our present calendar, which were published in SCIENCE for June 29 and September 2, are very pertinent and interesting. It is certainly time for some international action looking to the reform of our clumsy calendar. In this connection I beg leave to call attention also to a plan for the reform of the calendar presented last year to the first Pan-American Scientific Congress by Sr. Carlos A. Hesse, of Chili. He suggests the division of the year into thirteen months of 28 days each, the new month to follow December and be called Treccember. The extra day (for $13 \times 28 = 364$ only), he proposes to call "Zero Day," and it would not belong to any of the fifty-two weeks, or be called by any week day. The extra day in leap years he proposes to call "Double Zero Day," under like conditions. This project is nearly that suggested in the letters in SCIENCE referred to above, except that Dr. Slocum's plan (which he ascribes to Mr. Moses B. Cotsworth, of York, England) is to place the extra month in the *middle* of the year instead of at

the end, and name it the month of Sol, while the suggestion of Professor Reininghaus is that the extra month be divided into two fortnights, one to follow after June and be called the "summer half-month," and the other to come at the end of the year and be called the "winter half-month." Just why this latter scheme should be, as Professor Reininghaus claims, more "practical" than to keep the extra month intact, is difficult to see.

After studying the various schemes offered, the following plan would seem the most feasible:

1. Adopt the arrangement of 7 days to the week, 4 weeks (28 days) to each month, and 13 months plus 1 extra day (in leap years 2) to the year.

2. Place the extra month in the middle of the year between June and July. It should not be named Sol, because in the southern hemisphere the month would come in the dead of winter, and the name would be a misnomer. No name borrowed from the old French Revolutionary Calendar (*e. g.*, Thermidor) would be applicable either, for the same reason. It might be better to name the new month Rome or Roma, in tribute to the city where both the Julian and the Gregorian Calendars originated, or else give it a name meaning "mid-year." The objection to placing this extra month between December and January is that there would be such a gap between Christmas Day and New Year's Day, and Christmas would be thrown forward entirely out of a winter month.

3. Call the extra day New Year's Day, and do not apply to it the name of any week day. The objections to having Christmas as the extra day are that it does not come as the initial or final day of the year, and many persons, such as orthodox members of the Jewish Church, might reasonably object to such a unique distinction being given to Christmas Day. Non-Christian nations would probably object, too, and as any reform of the calendar should be such as would be internationally acceptable, it would be well to forestall all objections, if possible.

4. Begin every month with Monday. The same monthly calendar would then be repeated over and over throughout the year, and every one would know by memory the days of the week corresponding to the days of the month. Wall calendars would be absolutely unnecessary except in primary schools.

5. Call the second extra day in leap years "Leap Day," and let it follow New Year's Day.

6. It is rather a fortunate coincidence that according to this plan nearly all of our fixed national and state holidays would come on days other than Sunday: February 12, February 22, March 4, April 19, July 4, October 12, Thanksgiving Day, Christmas Day and many others.

Of course some rearrangement would be necessary with some of them. There are really three kinds of holidays or festivals to be looked after: (*a*) movable feasts, such as those of the church; (*b*) fixed dates, such as Christmas, All Saints' day, etc., which shift automatically with any change in the calendar, and (*c*) celebrations of certain *days*, not dates. For example, Washington was born on February 11 (see the entry in his mother's Bible at Mt. Vernon), but as this was the same *day* in the old style calendar which we now call February 22, we celebrate the latter day. Perhaps some of the dates in class (*c*) above mentioned would be shifted for the same reason in a reformed calendar (Washington's birthday itself, for example), but the dates belonging to classes (*a*) and (*b*) would take care of themselves.

7. This proposed calendar would, of course, bring about the occurrence of the vernal equinox several days later than March 21, but it is unlikely that the old controversy over this matter started at the Council of Nicæa and settled in the sixteenth century would again arise.

8. Any possible confusion in changing calendars would be avoided if at the same time the method invented by Scaliger in 1582 for harmonizing all systems of chronology is thoroughly explained to the people in general. According to this system each day has a num-

ber, beginning with an era now nearly seven thousand years ago. For example, January 1, 1911, will be Julian Day 2,419,038. The interval between any two dates, one reckoned by the old calendar, the other by the new, may be easily found when their Julian numbers are known, and these may be found or calculated from almanacs.

9. It is greatly to be hoped that, if a reform is made in the calendar, we shall adopt the plan of naming the hours in the day up to 24, so as to avoid the useless writing of A.M., P.M., M., and the like, after the hour. In Italy, for example, this simple plan is followed with the best results. ANDREW H. PATTERSON

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SCIENTIFIC BOOKS

Physical Science in the Time of Nero: Being a translation of the Quæstiones Naturales of Seneca. Pp. liv + 368. London, Macmillan & Co. 1910.

As the work of the most distinguished thinker, and writer of his time, the "Quæstiones Naturales" of Seneca (3-65 A.D.) commands attention; and as a landmark in the progress of human knowledge, it is of permanent interest. In this volume of 368 pages, the Roman philosopher did for his day what Aristotle had done four centuries earlier in his physical and meteorological treatises. Seneca records the observations of previous writers, adds many of his own and discusses all from the lofty plane of the philosopher and moralist.

This was only natural, as there was no school of experimental science in Athens, Alexandria or Rome in the lifetime of Seneca. Indeed, many a century had to pass before the inquirer into the phenomena and laws of nature condescended to measure and weigh, to use his hand as well as his intellect.

The Greek mind had for abstract truth a marked fondness which was unfavorable to such drudgery as manipulation; the Roman, while less subtle and more practical, also showed a decided preference for general observation and philosophical speculation.

Aristotle and his disciple Theophrastus were the authoritative masters of the physical

knowledge of Greek and Roman antiquity; and to them Seneca frankly acknowledges his indebtedness. But if from their pages on meteorology, astronomy and physical geography, he borrows the substance of some of his chapters, a perusal of the seven books which compose the "Quæstiones Naturales," will show that he has a clear way of describing the phenomena of nature and an insistent way of presenting his explanations and defending his opinions regarding them.

In the original, the work was divided into eight books which, in course of transcription, was reduced to seven by the union (probably) of Books II. and III.

Book I. treats of the rainbow, halos and mock suns; Book II., of lightning and thunder; Book III., of the forms of water; Book IV., of snow, hail and rain; Book V., of winds and general movements of the atmosphere; Book VI., of earthquakes, and Book VII., of comets.

In discussing the rainbow, Seneca remarks that it may be seen at night as well as during the day, provided the moon is unusually bright, to which he adds that the rainbow colors are the same as those which are seen by holding a glass rod obliquely in the path of the sun's rays. The magnifying power of a spherical water-lens did not escape his observant eye; for he says that "letters, however small and dim, are comparatively large and distinct when seen through a glass globe filled with water."

In treating of earthquakes, he recognizes three kinds of movements, viz., the *quaking* "when the earth is shaken and moves up and down"; the *tilting* "when, like a ship, it leans over to one side," and the *quivering* when "no great damage is usually done." He also adds the just observation that maritime districts are those which are most frequently shaken.

In his book on comets, he affirms that a comet is not "a sudden fire, but one of nature's permanent creations"; and he does not hesitate to berate one Ephorus for saying that a certain great comet which had been "carefully watched by the eyes of the whole world and which drew issues of great moment in its